Nov. 16, 1943. R. C. PIERCE 2,334,439

ANNEALING STEM

Original Filed March 8, 1940 3 Sheets-Sheet 1

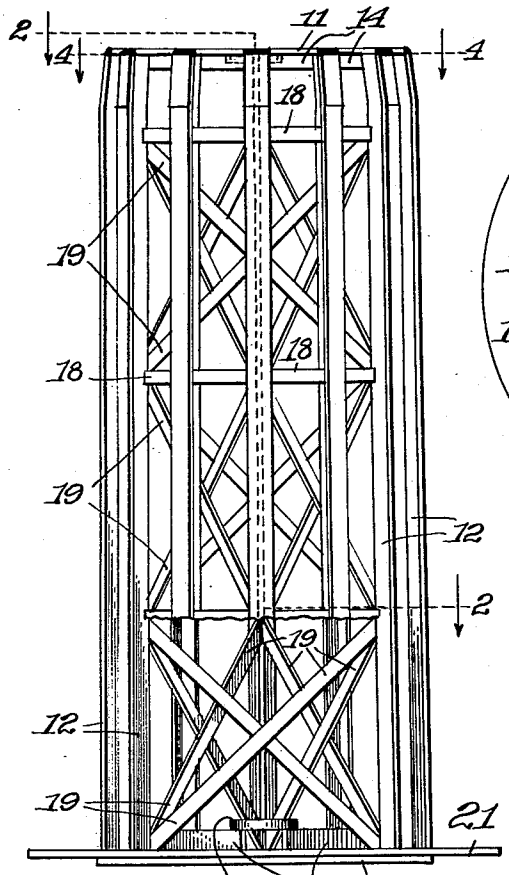


Fig. 1.

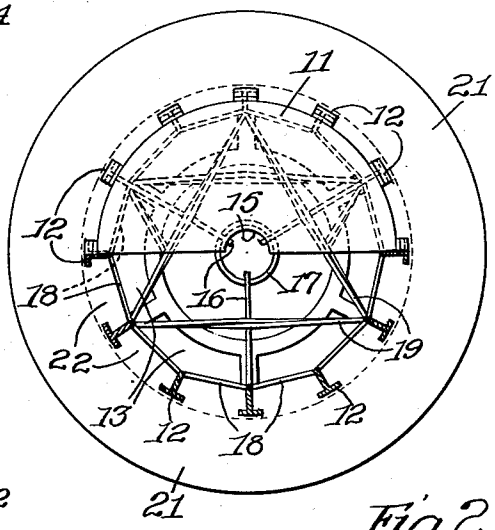


Fig. 2.

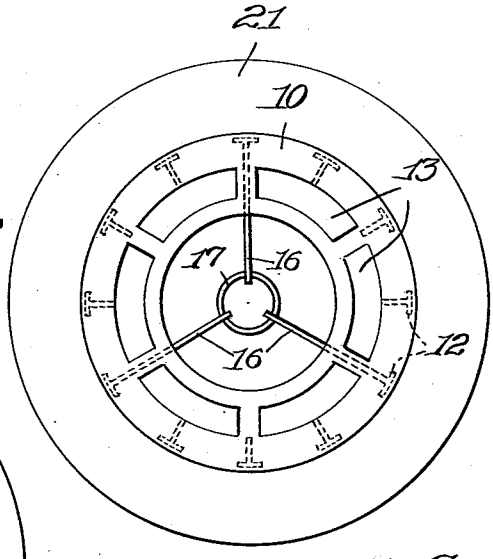


Fig. 3.

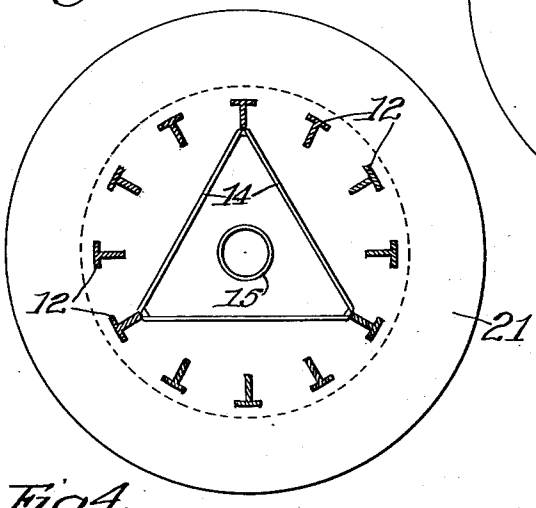


Fig. 4.

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ANNEALING STEM

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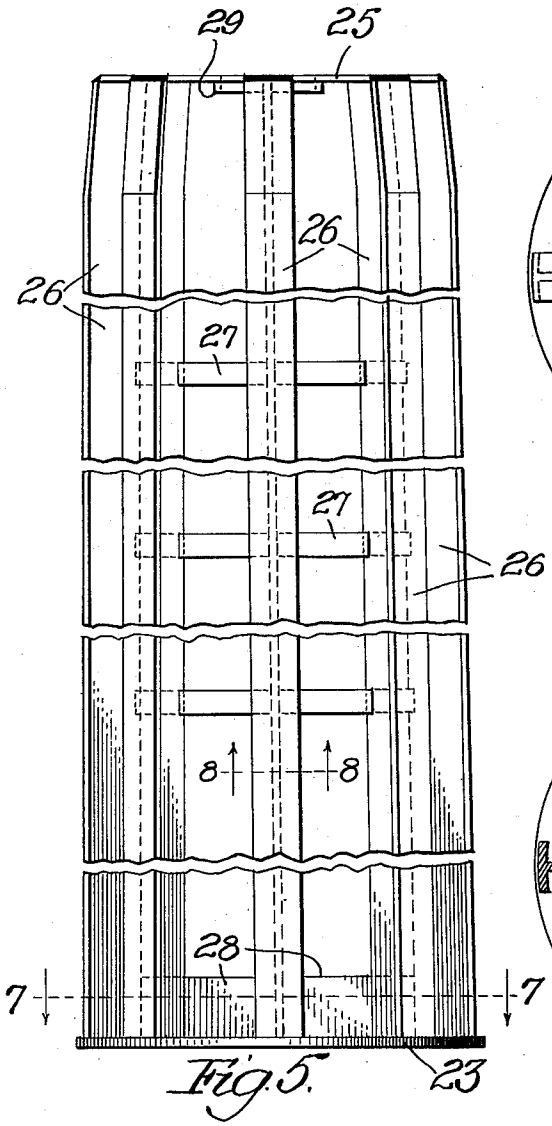


Fig. 5.

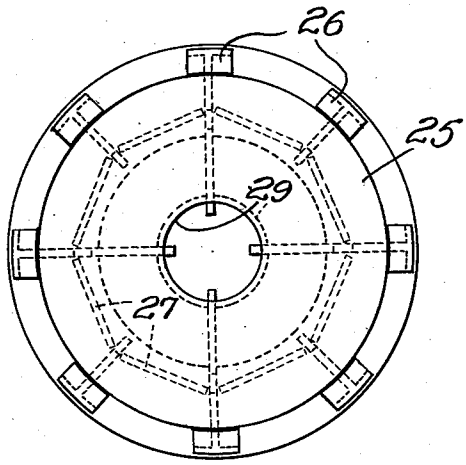


Fig. 6.

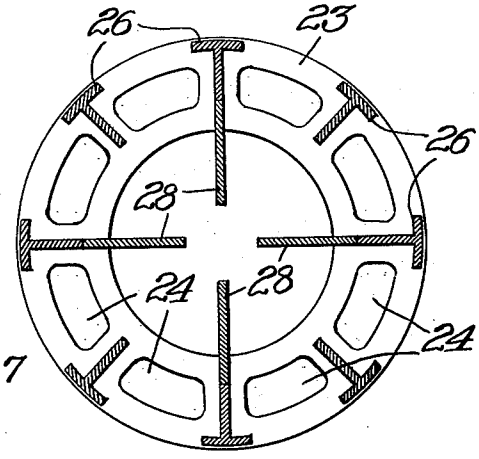


Fig. 7.

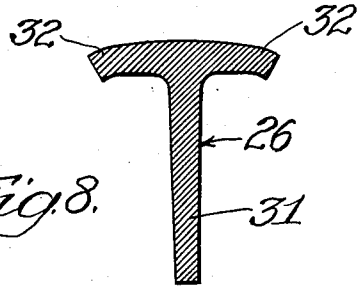


Fig. 8.

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ANNEALING STEM

Original Filed March 8, 1940 3 Sheets-Sheet 3

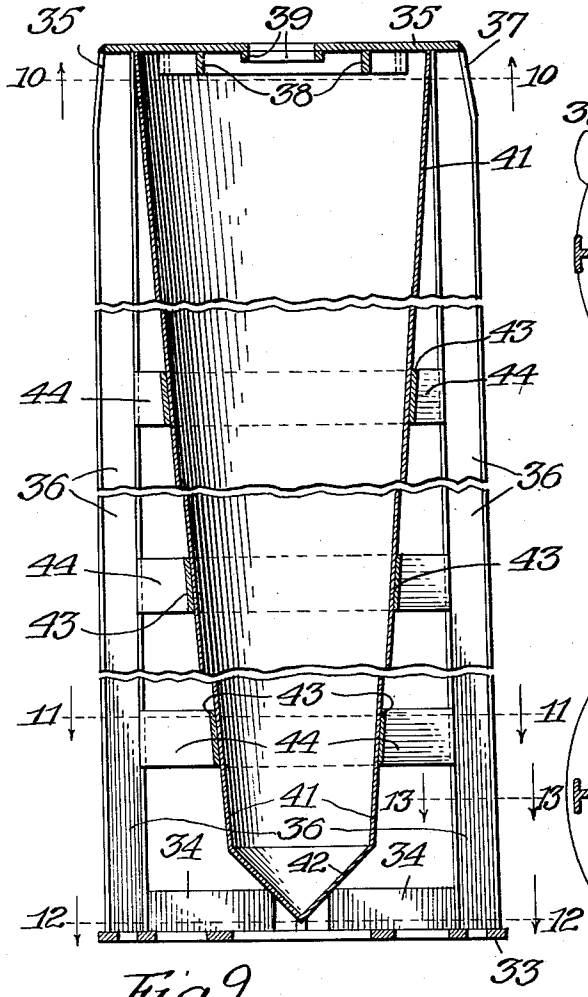


Fig. 9.

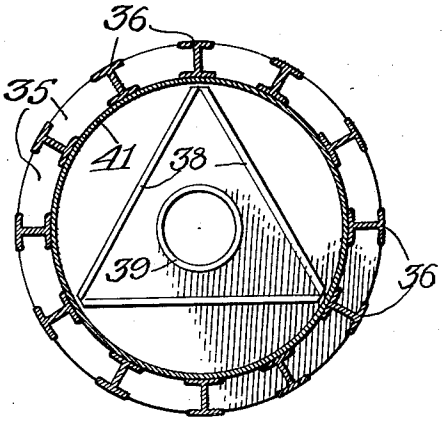


Fig. 10.

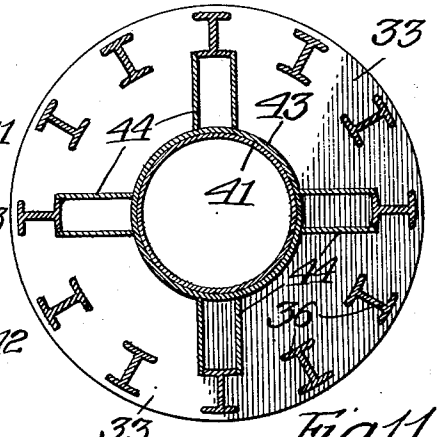


Fig. 11.

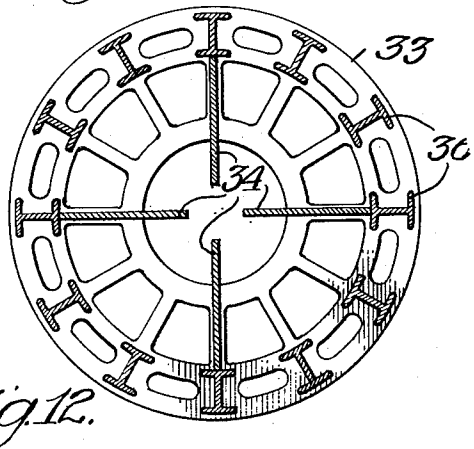


Fig. 12.

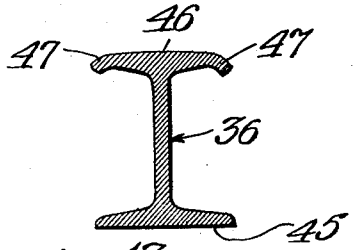


Fig. 13.

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Patented Nov. 16, 1943

2,334,439

UNITED STATES PATENT OFFICE

2,334,439

ANNEALING STEM

Robert C. Pierce, Niles, Mich., assignor to National Standard Company, Niles, Mich., a corporation of Michigan

Original application March 8, 1940, Serial No. 322,870. Divided and this application May 28, 1942, Serial No. 444,862

14 Claims. (Cl. 294—67)

This invention relates to annealing stems and more particularly to a structure for supporting coils of wire or the like during annealing or other heat treating operations.

One of the objects of the invention is to provide an annealing stem which is relatively inexpensive and light in weight while providing the necessary strength properly to support the wire coils.

Another object of the invention is to provide an annealing stem in which air or gases may circulate freely around the coil of wires around the stem. By this construction the wire of the coils is evenly heated for uniform treatment.

Still another object of the invention is to provide an annealing stem in which wire coils are properly supported around the stem during treatment and may be easily and quickly removed from the stem after treatment. According to one feature of the invention, the stem is provided with a stripper plate supported at the bottom thereof to carry the wire coils and slidable longitudinally of the stem to remove the coils therefrom.

A further object of the invention is to provide an annealing stem made up of annularly arranged vertical beams so constructed as to prevent damage to or cutting of the wire. Preferably the beams have exterior flanges rolled or otherwise curved to eliminate sharp edges which might tend to cut or score the wire.

The above and other objects and advantages of the invention will be more readily apparent from the following description when read in connection with the accompanying drawings, in which—

Figure 1 is a side elevation with parts broken away of an annealing stem embodying the invention;

Figure 2 is a section on the line 2—2 of Figure 1;

Figure 3 is a bottom plan view of Figure 1;

Figure 4 is a section on the line 4—4 of Figure 1;

Figure 5 is a side elevation of another annealing stem construction;

Figure 6 is a top plan view of Figure 5;

Figure 7 is a section on the line 7—7 of Figure 5;

Figure 8 is an enlarged partial section on the line 8—8 of Figure 5;

Figure 9 is a vertical axial section of another form of stem embodying the invention;

Figure 10 is a section on the line 10—10 of Figure 9;

Figures 11 and 12 are sections on the lines 11—11 and 12—12 respectively of Figure 9; and

Figure 13 is an enlarged partial section on the line 13—13 of Figure 9.

The stem illustrated in Figures 1 to 4 comprises a bottom ring 10 and a top ring 11 connected by a series of beams 12 arranged in annular array between the rings. The plate 10 may be cut out as indicated at 13 in Figure 3 to save weight and to provide openings through which heated air or other gases may circulate to heat coils of wire carried by the stem. Preferably the ends of the beams 12 are welded to the rings 10 and 11 although, other fastening means might be employed if desired.

The upper ring 11 may have welded or otherwise secured to its under face a series of ribs 14 arranged in a triangle connected at its apices to the beams 12. A small flange or ring 15 is secured around the central opening of the ring 11 to provide means for engagement with hooks or the like by which the stem may be handled.

The lower ring 10 is similarly reinforced by vertical radial ribs 16 connected to the periphery of a small steel ring 17. The ribs 16 and the ring 17 form centering means for cooperation with an unloading machine of the type more particularly described and claimed in my copending Patent No. 2,206,121.

The beams 12 are preferably formed of structural shapes such, for example, as T-irons as shown arranged with their flanges on the outer side. At their upper ends the T-irons are bent inwardly to form a cone shape portion at the upper end of the stems to facilitate loading the wire coils onto the stem.

According to one important feature of the invention the flanges of the T-irons forming the beams 12 are rolled inwardly at their edges as best seen in Figure 8 to provide curved outer surfaces to engage the wire coils. Preferably the flange surfaces of the T-irons are rolled about a radius smaller than the radius of the stem so that there will be no possibility of the relatively sharp edges of the flanges engaging the wire. By this construction any tendency of the wire to be cut or scored when sliding either onto or off of the stem is eliminated.

The stem is reinforced at spaced intervals along its length by strips 18 extending between the inner edges of the adjacent beams 12 and forming annular reinforcing rings dividing the stem lengthwise into a plurality of bays. Each of the bays is diagonally cross braced by a plurality of strips 19 arranged in crossed pairs and with the pairs lying in planes cutting chords of the rein-

forcing rings to form a triangle. The ends of the strips 19 are welded to the inner edges of the beams which are spaced 120° apart to form equilateral triangles in plan view as shown in Figures 2 and 4. The triangles so formed in each succeeding bay are spaced apart 60° so that alternate triangles overlie each other in the stem.

Coils of wire are adapted to be supported on the stem by a stripper plate 21 encircling the stem and supported by the lower ring 10. The stripper plate is freely movable vertically on the stem and is preferably formed with notches on its interior providing tongues 22 extending between the beams 12 to rest on the lower ring.

In using this stem, wire coils may be slid over the upper tapered end thereof to be supported by the stripper plate until the stem is filled. It may be then lifted into an annealing or other heat treating furnace where heated air and other heated gases will circulate through the openings in the stem and around the wire to treat it. Upon completion of the treating operation, the stripper plate 21 may be lifted from the stem to strip the coils of wire therefrom for further treatment or other desired use.

Another form of stem is illustrated in Figures 5 to 8 as comprising a base ring or plate 23 perforated as indicated at 24 to lighten it and for better gas circulation and an upper ring 25. The rings are connected by a plurality of beams 26 shown as being formed of T-irons arranged with their flanges facing outwardly and as reinforced by vertically spaced reinforcing rings 27. The base ring 23 is further reinforced by a plurality of vertical ribs 28 shown as 4 in number welded or otherwise permanently secured to the upper face of the ring. Reinforcing ribs are omitted from the upper ring 25 but a small annular flange 29 is formed thereon or is welded thereto for cooperation with lifting hooks.

Figure 8 illustrates more particularly the formation of the beams 26 which may be identical with the beams 12 of Figure 1 as comprising a web 31 extending radially of the stem and a cross flange at the outer edge of the web. The flange is rolled at its edges as indicated at 32 about a radius smaller than the radius of the stem so as to present a smooth surface to the coils of the wire carried by the stem. In rolling or otherwise bending the flanges, they may be formed to a continuous uniform curve throughout their width or the edges may be separately curved as shown, leaving the central portion substantially flatter than the edges. Either of these constructions is desirable for preventing the edges of the flange from scoring or cutting the wire.

Figures 9 to 13 illustrate a further embodiment of the invention comprising a base ring 33 braced by four vertical radial ribs 34. The base ring 33 is connected to an upper ring 35 by means of annularly arranged I-beams 36. The webs of I-beams 36 are gored at their upper ends to provide a taper as indicated at 37 in the top end of the stem. The top ring 35 is reinforced by triangularly arranged ribs 38 welded to the under surface thereof and carries a central flange or ring 39 for cooperation with the lifting mechanism.

Within the stem there is provided a cone shaped member 41 formed of light sheet metal with its upper end substantially filling the space within the beams and tapering to a point adjacent base ring 33 where it is closed by a sharper cone 42. The cone is supported within the stem by reinforcing rings 43 surrounding and engaging it at spaced intervals throughout its length and connected to the beams by pairs of steel strips 44 extending radially to the beams and welded thereto. With this construction, heated gases rising around the stems are forced outwardly from the interior thereof through the wire coils to provide better distribution of heat.

As shown in Figure 13, the I-beams 36 are formed with a central web and with inner and outer flanges 45 and 46. The inner flanges 45 may be left straight as shown, while the outer flanges 46 have their edges rolled in upon a radius smaller than the radius of the stem as indicated at 47. In this way, the coils are protected against cutting or scoring, the flange construction being substantially similar to that of the T-beams of Figures 1 and 5.

It will be understood that the stems of Figures 5 and 9 may be used in substantially the same manner as the stem of Figure 1, being provided with a slidable stripper plate the same as the stem of Figure 1. These stripper plates in Figures 5 and 9 have been omitted for clarity of disclosure.

This application is a division of my copending application, Serial No. 322,870, filed March 8, 1940.

While several embodiments of the invention have been described in detail, it is understood that these are illustrative only, and are not intended as a definition of the scope of the invention, reference being had for this purpose to the appended claims.

What is claimed is:

1. Apparatus for handling coils of wire and the like comprising upper and lower rings connected by vertical bars, and an annular support encircling said bars and movably resting on the lower ring.

2. Apparatus for handling coils of wire and the like comprising upper and lower rings connected by vertical bars, and an annular support encircling said bars and movably resting on the lower ring, said upper ring having a downwardly extending flange surrounding its central opening for engagement with a lifting and transporting device.

3. Apparatus for handling coils of wire and the like comprising upper and lower rings connected by vertical bars, an annular support encircling said bars and movably resting on the lower ring, and steel reinforcing members welded between certain ones of said bars to form reinforcing rings at spaced points along the length of said bars.

4. Apparatus for handling coils of wire and the like comprising upper and lower rings connected by vertical bars, and an annular support encircling said bars and movably resting on the lower ring, said bars being of structural steel shapes including at least a flange and a web and having the flange facing outwardly and formed with its edges curved sharply inwardly.

5. Apparatus for handling coils of wire and the like comprising upper and lower rings connected by vertical bars, steel reinforcing members welded to said bars to form reinforcing rings at spaced points along the length of said bars, and cross bracing members extending between said rings and some ones of said bars in planes cutting chords of the circles formed by said reinforcing rings.

6. Apparatus for handling coils of wire including upper and lower rings, bars secured between said rings to form a stem, and a thin metal cone

secured within said stem with its apex within the vertical limits of the apparatus.

7. Apparatus for annealing coils of wire comprising upper and lower rings, vertical bars secured between said rings, lifting means including a downwardly extending flange formed around the opening of said upper ring, and reinforcing means for said upper ring including steel bars welded to the lower surface of said upper ring and having their ends welded together to form a triangular rib circumscribed about said opening.

8. Apparatus for handling coils of wire and the like comprising a structure adapted to extend vertically through a stack of such coils and having an annular outwardly-projecting support at its lower end, and a ring-shaped stripper member surrounding said structure and resting movably on said support and on which the lowermost coil rests.

9. Apparatus for handling coils of wire and the like comprising a structure including vertically-extending bars and which is adapted to extend vertically through a stack of such coils and which has an annular outwardly-projecting support at its lower end, and a ring-shaped stripper member surrounding said structure and resting movably on said support and on which the lowermost coil rests and which has at its inner edge tongues projecting between said bars.

10. Apparatus for handling coils of wire or the like comprising upper and lower rings and circumferentially spaced vertical bars in annular array connecting the rings, the bars being of structural steel shapes including a flange and a web and having the flange facing outwardly, the edges of the flange being curved inwardly about a radius smaller than the radius of the annulus of the bars.

11. Apparatus for handling coils of wire or the like comprising an upper ring, a lower ring of larger diameter than the upper ring, vertical bars arranged in annular array between the rings and connected thereto, the bars being bent inwardly adjacent their upper ends to form with the rings a vertical hollow stem having a truncated conical upper portion.

12. An arbor of the character described comprising a plate metal base, a plurality of flanged metal uprights rising therefrom, bracing members at different elevations joining said uprights, and means connecting the uprights together at their upper extremities.

13. An arbor of the character described comprising a flat plate metal base, a plurality of circularly arranged flange members rising therefrom, the lower ends of said members being welded to the base, a plurality of intermediate reenforcements at spaced elevations joining the flanges of the uprights to one another, and means including welded joints uniting the upper extremities of said uprights.

14. An arbor of the character described comprising a flat steel base, a plurality of rolled steel structural T-bars whose lower extremities are welded thereto, the upper extremities of said T-bars being arched radially inward and means including welded joints connecting the upper extremities of said T-bars.

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